TALIPES VARUS:

ITS PATHOLOGY AND TREATMENT.

A CLINICAL LECTURE.

EGE OF SURGEONS OF ENGLAND

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I AM frequently asked by former students where they can find a description of the operation for Talipes which they had seen performed by me during their student days. I have therefore reprinted this Lecture.

G. B.

TALIPES VARUS.

THERE are few operations in surgery which the surgeon approaches with more satisfaction than those for the cure of natural deformities. Amputation of limbs, resection of joints, and excision of tumours, are necessary and important as a means of saving or prolonging life after other treatment has failed to remove or arrest disease ; but these are evidences of the imperfection of our knowledge of the nature and origin of many affections, and, at all events, of the inefficiency of our therapeutic applications. Let us hope that the advance of pathological and therapeutical knowledge will one day diminish the number of radical operations, which at present are necessary in the treatment of surgical diseases.

But we cannot expect that any extension of our researches will diminish the number of children born with congenital deformities. Into the popularly supposed causes of these defects, it is not our place to enter; it is sufficient that they are common enough to demand a careful consideration on our part. It is very probable that many of you who are destined to become general practitioners, may never be called on to perform operations for the cure of deformities, delegating these duties to those who are to take the position of operating surgeons ; but some of you will, I have no doubt, have as your sphere some place where you must rely on your own resources for every medical service de-

manded by your patients; and all of you will have it in your power to advise and direct patients as to the proper course to be followed. This is a most important position, for it is in early years that most of these defects can be most readily remedied. Never was this more impressed on my mind than by the case now before you. Here is a young man, eighteen years of age, who has been the victim of talipes varus since infancy. The deformity seemed so hopeless to the medical attendant, that he did not venture to suggest any treatment; and the various consultants who were from time to time referred to, dissuaded the parents from any operative interference. Six months ago he came to me, and, though the deformity was extreme and all the structures implicated were rendered rigid by the length of time they had been in their unnatural position, I did not despair of being able to improve his state, at least in a material degree. The result has exceeded our most sanguine expectations, and the patient is here to walk across the theatre on the sole of his foot, a thing he never did in his life till a month ago.

The further illustration of this subject will be found in connection with the case I shall now introduce, and also another in the wards, which will be operated on a short time hence. Here is a boy, aged seven years, with a well-marked example of talipes varus, or inverted club-foot. Observe the particulars of the distortion. First, the heel is raised and twisted towards the opposite foot. Second, the inside of the foot is twisted round so that the sole of the foot looks upwards, and the boy walks on the dorsum of the tarsus turned down. The sole of the foot is also curled inwards, so that the ball of the great toe is much closer to the heel than it ought to be. The whole foot is so distorted that the only kind of boot which the boy can wear for the protection of the skin is a sort of leather bag with a strong thick sole. Let us now consider the structures concerned

in this deformity. Let me remind you, then, club-foot exists in four varieties—talipes equinus, talipes calcaneus, talipes valgus, and talipes varus. Each of these varieties may depend on atony of one set of muscles, or an undue contraction of the antagonistic set. Hence we have tonic and atonic talipes. Now it is important to recognise this difference, because, though in both you may, by mechanical or operative means, improve the shape of the foot, yet it is in the tonic variety alone that you can promise a really favourable result as regards the future power of walking. I am far from taking a hopeless view of cases depending on muscular atony, or paralysis as it is often called, for I have had under my care a great many children in whom by persevering mechanical, gymnastic, and operative treatment I had had every reason to be satisfied with the result. The whole subject of the proper treatment of muscular atony, whether the result of deformity or prolonged retention in one position, is well deserving of notice, and I shall call your attention to it in another lecture.

The case before us is one of the tonic variety, in which the distortion is produced, or at least kept up, by the contraction or rigidity of the muscles, tendons, ligaments, and fasciæ. With regard to the muscles, the first thing I wish to impress on you is the difference between *contraction* and *rigidity*, although these two terms are too often used indifferently. By contraction is meant the physiological action of a muscle, the vital movement produced in and by its particles. This, of course, cannot be continuous, but must be interrupted, varying with the stimulus applied to its molecules. But, by rigidity, we mean a permanent condition produced by the long retention of the muscle in one position. It loses its contractility to a great extent, and to a certain degree its elasticity, and assumes more of the nature of a tendon than a fleshy mass. Of course there are

various degrees of rigidity, but in extreme cases the above is a true description.

Examples of distortion maintained by muscular contractility are to be found in fractures and dislocations, where the abnormal position of the articulation or fragment of bone is maintained by the action of the muscles, to overcome which we have recourse to mechanical position, or the administration of chloroform, or both.

But in a club-foot the deformity is maintained more by mechanical rigidity than vital contractility. The muscles are shortened and stiffened in a very unyielding manner, and chloroform enables us to act on them only in so far as it abolishes pain and prevents the struggles of the patient.

There is no doubt that in persons with club-foot, who have been allowed to grow up and use the foot in walking, the bones of the tarsus become more or less altered in shape by mutual pressure, and the ligaments become shortened and stiffened ; but primarily, and even in adult cases principally, the muscles, tendons, and fasciæ are the offending structures.

In talipes varus the muscles concerned in the deformity are of two classes: those of the leg and those of the foot. First, there is the tendo achillis, which is the cause of the elevation of the heel. Then the muscles of the leg which pass round the inner malleolus are more or less implicated, but it is only the tibialis posticus which is worthy of notice, and I believe that it is not nearly so important as many writers would seem to indicate. A muscle of its length, even when very rigid, can be stretched to a considerable degree, and if there are any cases of club-foot which can be "cured without cutting tendons," as some surgeons would have us believe, they must be very trifling examples of the deformity, and the defect must depend wholly on the long muscles of the leg, which is very rarely the case.

Turning now to the structures in the sole of the foot, we find several of these the principal, in many cases the only cause of the distortion. The plantar fascia is always rigid and unyielding, and is stretched like a suspension-bridge across from the heel to the ball of the great toe. But I believe that there is something even more important than the fascia. My attention was first called to this matter by the unsatisfactory results of my earlier operations, in which my incisions were planned after the most reliable information I could find. I used to divide the tendo Achillis, the tibialis posticus, and the plantar fascia, all by subcutaneous incision; but, in many cases, I found either that the incurvation of the foot did not yield, or it recurred with a rapidity which showed that something more was wanted.

Reflect for a few minutes on the anatomy of the foot. Composed of a number of separate bones, articulated in such a way as to give that lightness and elasticity of step which is one of the prerogatives of man, there is one special joint on which centres its principal movement. I mean the ball and socket articulation, between the head of the astragalus and the cup of the scaphoid. The muscles of the sole are composed of two sets; one the superficial, which acts from the os calcis on the distal part of the foot; the other, all the deeper layers, which, arising in front of the os calcis and astragalus, control the more minute movements, which are of such service to those who walk barefoot. The articulations in front of the astragalo-scaphoid and the muscles which act on them are little, if at all, concerned in club-foot, the inversion and incurvation being situated in the joint referred to, and produced by the muscles which act on it.

The tibialis posticus is inserted into the tuberosity of the scaphoid bone, part of the tendon being sent forward to the bones anterior to it; but the important point for the surgeon is its attachment to the scaphoid bone. When it is in

a state of undue contraction or rigidity, it pulls the scaphoid round upon the head of the astragalus, and so twists the foot inwards, as you may see from the dissected specimen I here show you.

But in this other dried specimen of the bones of a case of varus, you will see that there is something more. The ball of the great toe is approximated to the os calcis to a degree that could not be accounted for by the action of a muscle attached to the scaphoid bone.

Now, I bring back the boy who was here a short time ago, and point out to you, on the inner side of the foot, a thick, strong, rigid band, binding the great toe towards the heel; and, on stretching the toe, it becomes as tense as a tight-rope. The superficial part of this band, no doubt, consists of fascia, but the thick mass is the rigid and unyielding substance of the abductor pollicis muscle. You will remember that the relation of the plantar fascia to the muscles of the foot is peculiar. They adhere to its deep surface, and their origin is greatly extended by this adhesion of their fibres to it. On the outer edge of the foot, and to the middle of the sole, the fascia is adherent to the muscular layer as far forward as the ends of the metatarsal bones, so that there is comparatively little muscular movement in that region; and it will be remembered that the outer part of the foot, both owing to this disposition of its muscle, and the small number of articulations, is designed to be a lever of station, while the spring of the foot depends on the elasticity of the inner arch of the instep. The abductor pollicis is covered by a comparatively thin layer of fascia, but just at the place where it lies against the flexor brevis digitorum, the fascia is thick, and there is a firm dense septum between the two muscles which adheres to both. This septum is well known to anatomical students, as its dissection to expose the deeper structures of the foot is a piece of manipulation requiring much care and time. If a case of talipes

varus be critically examined, it will be found that the rigid band retaining the great toe in its incurved state, corresponds precisely with the situation of the septum I have alluded to, and the fascia covering the adjacent sides of the abductor pollicis and the flexor brevis digitorum. I again show you, in this boy's foot, the prominent unyielding band in the very region I have just indicated.

Now, I believe it is the close adhesion between the muscles I have named and the inner part of the plantar fascia which renders it so difficult for the surgeon to restore the proper shape of the foot, even after a partial division of the plantar fascia. No sooner is the section made than the muscular action tends to approximate the cut edges of the fascia, and, notwithstanding every effort, causes their union in a few days. It was this result in my earlier operations, demanding fresh incision, that made me dissatisfied with the operation as I then carried it out, and made me adopt the plan I now follow.

Let us now consider the various steps of the operation required for such a case as we have just seen; and I may here state that I do them all at the same time, and not in successive stages, as is often done; except in cases where the first incision in the sole is not sufficient, as is not unfrequently the case in adults.

The first part of the operation is the division of the tendo Achillis, which may be done either by introducing the tenotomy-knife in front of it and cutting outwards to the skin, or, as I always do, passing the knife superficial to it while it is in a state of relaxation, and cutting down upon it while extended till it snaps asunder. There are very few cases of talipes varus in which this is not necessary as a preliminary. Many surgeons do this part of the operation some weeks before attempting the rest; but I have seen no reason to depart from the plan of doing all the cutting part at the same time.

The second part of the operation, where it is necessary, is the division of the tibialis posticus. This I believe to be very seldom required. I am convinced of this, that if those surgeons who are in the habit of cutting it above the malleolus internus as the second part of the operation would delay it till the following proceeding is adopted, they would find very few cases in which it would be necessary. I explain this by the fact that it is really not often affected so much as is supposed; and also that, being a long muscle, it may be stretched in the subsequent manipulations. I never cut it above the malleolus, but I have seen it done by others; and I can confidently state that, in at least some in which the operator had satisfied himself that the division was effected, there was no release to the foot from its distorted state—in fact, it remained bound in its abnormal shape by the tissues next to be dealt with. If I were quite satisfied that the tibialis posticus was very tight in an adult with talipes, I should divide it above the malleolus; but, in children, I prefer to make the incision just proximal to its insertion into the scaphoid bone, through the same opening that is necessary for the next part of the operative proceedings.

The third stage is the division of those structures which maintain the incurvation of the astragalo-scaphoid joint, to which I have already referred, and which pull the ball of the great toe towards the heel. To effect this, the tenotomy-knife is to be entered at the inner edge of the foot just behind the tuberosity of the scaphoid bone. It is to be kept flat and pushed under the skin till it reaches to the middle of the sole; then it is to be turned with its edge to the plantar fascia, which is to be divided by a sawing movement of the knife, the parts being kept in extreme tension by an assistant. When the knife has passed through this part of the fascia, the point is to be dipped down so as to divide as far as possible the septum of fascia

described before, and then the whole of the muscular substance down to the tuberosity of the scaphoid is to be cut through; and, before removing the knife from the aperture of entrance, the point may again be depressed, and the tendon of the tibialis posticus divided, proximal to its insertion into the scaphoid.

This may seem a somewhat heroic incision, but its effects on the distortion are most satisfactory; and I may state that I have never experienced any bad results from it, though I am in the habit of operating in this way many times annually. I believe that sometimes the internal plantar nerve and artery may be cut; but the artery in a child is a mere trifle, and never gives rise to hæmorrhage after the application of a bandage, and, as for the nerve, we know how rapidly repair of divided nerves occurs. At all events, experience shows that such incisions may be made subcutaneously with impunity, and with results which warrant their performance. When the muscular substance of the abductor pollicis is divided, the tendency of the plantar fascia to come together is obviated, at all events, till the muscle reunites; and if means are taken to prevent that for a time, the cure of the deformity is rapid. When the incisions are completed, a pad of lint is to be placed on each of the apertures of entrance of the knife, and a bandage applied round the foot and ankle. I then usually put on the club-foot spring-boot for an hour or two.

But the operative part, although very important, is by no means the only part of the treatment. For days, weeks, and months, the most patient and persevering manipulations must be carried on. I do not approve of keeping the foot in a rigid apparatus, and gradually screwing it round to the proper shape, even if that could be done. For at least a week or ten days, the apparatus is to be put on first for an hour or two morning and evening, adding an hour daily, till at last it is only removed for an hour morning and evening,

in order to undergo the necessary manipulations. These for the first week or two must be performed by the surgeon or his assistant, or by a skilled nurse, as no parent will undertake them at the outset. They are the *douche*, frictions, shampooing, and, above all, the systematic twisting of the foot towards its natural position. This is the most important part of the treatment, for during it the muscles are brought into play to a certain extent; and, if the child be old enough, or sufficiently intelligent, you will find that it will use the antagonistic muscles to assist you to turn out the foot, in order to avoid the pain produced by the twisting, which is always increased at first by the involuntary, though vain endeavour to struggle against you. So important is this assistance, that I am in the habit of offering small rewards to the child to bribe him to turn out his foot without assistance. It not only helps you to overcome the deformity, but it adds tone to the peronei muscles, and is of singular value when you allow the child to begin to walk, which at first must always be done while the boot is worn.

These being the chief points of importance to guide you in the management of such a case, I shall now again bring in the boy and make the incisions I described. The subsequent treatment will be done in the ward for a few days by myself, and then he will be committed to the charge of the dressers, who will on alternate days perform the manipulation described at the end of the lecture.

The spring steel boot to which I have referred must be worn by the patient for many months after the operation. By it you do not gain anything more than you have already achieved by the tenotomy and subsequent continued twisting of the foot; but by its use you retain the improvement you get by the manipulation, and prevent the foot recoiling to its old position.

The boot made by Mr. Hilliard, of Glasgow, serves the purpose as well as any I have seen. There is one detail

which I always insist on, especially when the child is young—viz., that the steel rod on which the boot is fixed, shall extend up to the pelvis, with a joint at the ankle, knee, and hip. Unless the rod is made thus long, the foot and leg very soon tend to become inverted, and so the effect of the everting spring of the apparatus is counteracted, and its efficiency lessened. But made as I have mentioned the results are most satisfactory.

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